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Implementing The Tracking Network

breakout ABSTRACT

Abstract No. 13

TITLE
MODELING THE PROBABILITY OF ARSENIC IN GROUNDWATER IN NEW ENGLAND AS A TOOL FOR EXPOSURE ASSESSMENT

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Network Content

OBJECTIVES
Existing data are valuable information for studies that characterize ground water contaminants. For modeling, they can often be combined with new data to fill in data gaps. We used data from the drinking water programs of the six New England States, as well as other data, to develop a model to predict the probability of arsenic in private bedrock wells.

SUMMARY
We developed a process-based model to predict the probability of arsenic exceeding 5 micrograms per liter in drinking water wells in New England bedrock aquifers. The model is being used for exposure assessment in an epidemiologic study of bladder cancer. One important study hypothesis that may explain increased bladder cancer risk is elevated concentrations of inorganic arsenic in drinking water. In eastern New England, 20-30% of private wells exceed the arsenic drinking water standard of 10 micrograms per liter. Our predictive model significantly improves the understanding of factors associated with arsenic contamination in New England. Specific rock types, high arsenic concentrations in stream sediments, geochemical factors related to areas of Pleistocene marine inundation and proximity to intrusive granitic plutons, and hydrologic and landscape variables relating to groundwater residence time increase the probability of arsenic occurrence in groundwater. Previous studies suggest that arsenic in bedrock groundwater may be partly from past arsenical pesticide use. Variables representing historic agricultural inputs do not improve the model, indicating that this source does not significantly contribute to current arsenic concentrations. Due to the complexity of the fractured bedrock aquifers in the region, well depth and related variables also are not significant predictors

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